

The opinion in support of the decision being entered today was *not* written for publication and is *not* binding precedent of the Board.

**UNITED STATES PATENT AND TRADEMARK OFFICE**

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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

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*Ex parte* SANG-BOM KANG, CHANG-WON LEE,  
GIL-HEYUN CHOI, and SEONG-GEON PARK

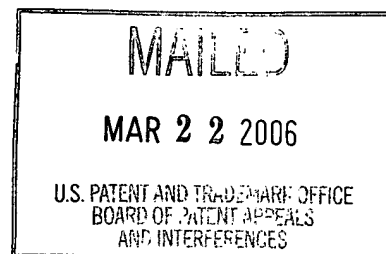
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Appeal No. 2006-0378  
Application No. 10/052,703

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HEARD: February 22, 2006

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Before KIMLIN, TIMM, and JEFFREY T. SMITH, *Administrative Patent Judges*.  
TIMM, *Administrative Patent Judge*.

***DECISION ON APPEAL***

This appeal involves claims 1-37. Claims 38-40, the only other claims pending in the application, have been withdrawn from consideration. We have jurisdiction over the appeal pursuant to 35 U.S.C. § 134.

### ***INTRODUCTION***

The Examiner rejects the claims under 35 U.S.C. § 103(a). As evidence of unpatentability, the Examiner relies upon the following prior art references:

Chen et al. (Chen)	US 4,534,816	Aug. 13, 1985
Sato	US 6,120,605	Sep. 19, 2000

The specific rejections maintained are:

1. Claims 1-9, 12, 14, 15, 19 rejected under 35 U.S.C. § 102(b) as anticipated by Chen; and
2. Claims 10, 11, 13, 16-18, and 20-37 rejected under 35 U.S.C. § 103(a) as unpatentable over Chen in view of Sato.

Substantially for the reasons provided by Appellants in their Brief, we reverse.

We add the following primarily for emphasis.

### ***OPINION***

With regard to the rejection under 35 U.S.C. § 102(b), there are two independent claims subject to this rejection, claims 1 and 9. The issues presented by claim 9 are different from the issues presented by claim 1. We will, therefore, address claim 9 separately.

We consider the issues presented by claim 1 first. Claim 1 is directed to a shower head having a cooling system comprising a plurality of coolant inlets, a plurality

of coolant outlets, and a plurality of inner cooling lines configured to connect the inlets and outlets. Claim 1 reads as follows:

1. A shower head for supplying a reaction gas to a wafer in a process chamber, the shower head comprising:

a plurality of plates comprising gas paths for supplying a reaction gas to a wafer; and

a cooling system comprising a plurality of coolant inlets and a plurality of coolant outlets formed in a lower one of the plurality of plates, and further comprising a plurality of inner cooling lines configured to connect each of the plurality of coolant inlets to one of the plurality of coolant outlets.

According to the Examiner, Chen describes a cooling system 22 comprising a plurality of coolant inlets 56 and a plurality of coolant outlets 62 as shown in Figure 5. The Examiner further finds that the passageways between 56 and 62 are a plurality of inner cooling lines as claimed. Appellants argue that Chen describes a single passageway 56 with a single vertical inlet hole 66 and a similar outlet hole 68 (Brief, pp. 4-8). According to Appellants, there being only one inlet, one passageway, and one outlet in the plate of Chen, there is no anticipation. The Examiner sees no difference between the structure of Chen and the claimed cooling system because both are passageways within one closed cooling circuit (Answer, pp. 3-4).

What the Examiner's analysis overlooks is the scope of the claim. The words "inlet" and "outlet" as used in the claims must be read in light of the specification as those words would be interpreted by one of ordinary skill in the art. *See In re Am.*

*Acad. of Sci. Tech. Ctr.*, 367 F.3d 1359, 1364, 70 USPQ2d 1827, 1830 (Fed. Cir. 2004)(During examination, "claims ... are to be given their broadest reasonable interpretation consistent with the specification, and ... claim language should be read in light of the specification as it would be interpreted by one of ordinary skill in the art."). One of ordinary skill in the art understands an "inlet", in the context of a circulating system, to be an opening providing a means of entrance or intake into a structure: it is located at the boundary of the structure being entered. An inlet allows fluid to pass from outside the structure to a point inside the structure. Likewise, an outlet is a passage for escape or exit from a structure. Appellants use these terms in conformance with their ordinary meaning. In each of the embodiments of Figures 2-4, Appellants describe the coolant inlets and outlets of the plate as located "along the edge of the third plate 350" (specification, p. 6, ll. 25-28) or along the sides of the third plate 350 (specification, p. 7, ll. 31-34 and p. 8, ll. 10-12). In each case, at the inlet, fluid flows from a passageway *outside* of the plate to a passageway *within* the plate and at the outlet, fluid flows from a passageway *within* the plate to passageway *outside* the plate.

Chen does not describe a plurality of inlets, inner passageways, and outlets in a lower plate of a shower head as claimed. In the shower head of Chen, as explained by Appellants, the passageway 56 of Chen is a single inner passage connecting one inlet hole 66 and one outlet hole 68. Passageway 56 does not, at multiple locations extend

outside the plate, it is at all times conveying fluid within the plate. Openings 58 and 62 shown in Figure 6 are not inlets and outlets within the meaning of Appellants' claims because these "openings" are closed off by ring 64 that is inserted into groove 60. This ring is in place in the shower head structure of Chen. Once the ring 64 is inserted, there is one continuous serpentine passage 56 formed in the plate (electrode 12). Fluid neither enters nor exits the plate through the closed off openings 58 and 62, the fluid remains within the plate.

We, therefore, find that the Examiner has failed to establish anticipation of the subject matter of claim 1 and claims 2-8 dependent thereon within the meaning of 35 U.S.C. § 102 because the Examiner has not shown that each and every limitation is met by the shower head of Chen.

Turning to claim 9, this claim is directed to an apparatus including a heater stage located in a lower portion of a process chamber and a separating device arranged between a bottom of the process chamber and a bottom of the heater stage. Claim 9 reads as follows:

9. An apparatus for forming a thin film, said apparatus comprising:

a process chamber;

a heater stage located in a lower portion of the process chamber,  
said heater stage configured to support a wafer and to heat the wafer to a  
high temperature;

a shower head located in an upper portion of the process chamber,  
said shower head configured to supply a reaction gas to the wafer; and

a separating device arranged between a bottom of the process chamber and a bottom of the heater stage, said separating device configured to separate the heater stage from the bottom of the process chamber and to reduce a volume of processing space within the process chamber.

The Examiner finds that Chen describes a heater stage 40 located in a lower portion of the process chamber 30 and a separating device 44 arranged between the process chamber 30 and the heater stage 40. But the Examiner makes no finding that the separating device 44 is located between the bottom of the process chamber and the *bottom* of the heater stage. In fact, as shown in Figure 1 of Chen, the separating device (insulating ring 44) is located on an *upper* surface of what the Examiner finds is the heater stage 40, not the *bottom* surface thereof. Because the Examiner has failed to establish that each and every limitation of claim 9 is met by Chen, we find that the Examiner has failed to establish anticipation of the subject matter of claim 9 and claims 12, 14, 15, and 19 dependent thereon within the meaning of 35 U.S.C. § 102.

The Examiner rejected claims 10, 11, 13, 16-18, and 20-37 under 35 U.S.C. § 103(a) as unpatentable over Chen in view of Sato.

Claims 10, 11, 13, and 16-18 are dependent on claim 9. According to the Examiner, “[i]t would have been obvious to one of ordinary skill in the art at the time the invention was made to replace Chen’s wafer supporting and heating structure with Sato’s supporting and heating structure ... to process a wafer at optimal temperatures.” The motivation for doing so, according to the Examiner, would be to provide an

alternative and equivalent means for wafer supporting and heating.” (Final Rejection, p. 10).

Even if there is motivation to make the modification as advanced by the Examiner, we agree with Appellants that the resulting apparatus would not meet the requirements of the claims (Brief, p. 14). As made clear by Appellants, the lower portion of sidewall 11 of Sato is part of the process chamber and, therefore, analogous to bottom 205 of chamber 200 shown in Appellants’ Figure 1. Claim 9, the claim from which claims 10, 11, 13, and 16-18 depend, requires the presence of “a separating device between a bottom of the process chamber and a bottom of the heater stage.” This requires that the separating device be a separate structure from the processing chamber. Something cannot be between itself and another object. There is no separating device over and above the process chamber sidewall in Sato.

We, therefore, agree with Appellants that the Examiner has failed to establish a prima facie case of obvious with respect to the subject matter of claims 10, 11, 13, and 16-18.

Claim 20 is an independent claim directed to an apparatus including a shower head. The shower head includes a cooling system arranged in a lower plate. The cooling system comprises a plurality of coolant inlets, a plurality of coolant outlets, and a plurality of independent inner cooling lines for connecting the inlets and outlets. This claim also requires the presence of a separating device.


Because this claim requires that the cooling system arranged in the lower plate of the shower head has a plurality of inlets, outlets, and independent passageways, we agree with Appellants that, for the reasons discussed with respect to claim 1, Chen fails to teach the cooling structure. The Examiner does not rely upon Sato to meet this aspect of the claim.

Therefore, we conclude that the Examiner has failed to establish a prima facie case of obviousness with respect to claim 20 and claims 21-37 dependent thereon.

### ***CONCLUSION***

To summarize, the decision of the Examiner to reject claims 1-9, 12, 14, 15, and 19 under 35 U.S.C. § 102(b) and claims 10, 11, 13, 16-18, and 20-37 under 35 U.S.C. § 103(a) is reversed.



  
EDWARD C. KIMLIN  
Administrative Patent Judge

*Catherine Timm*  
CATHERINE TIMM  
Administrative Patent Judge

  
JEFFREY T. SMITH  
Administrative Patent Judge

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